

What is claimed is:

- 1 1. A water generating device for extracting water from ambient air, comprising:  
2 a thermoelectric cooling device having a cold side and a hot side;  
3 a cold sink thermally coupled to the cold side of the cooling device, for cooling air that  
4 contacts the cold sink;  
5 a heat sink thermally coupled to the hot side of the cooling device, for removing heat  
6 from the cooling device;  
7 one or more air moving means for directing a stream of ambient air past the cold sink, to  
8 cool the air below its dew point and condense water from the air stream; and  
9 passage means for directing the air cooled by the cold sink past the heat sink, to remove  
10 additional heat from the cooling device, to increase its efficiency.
- 1 2. The water generating device of claim 1 further including dew point sensor means for  
2 determining the dew point of the ambient air.
- 1 3. The water generating device of claim 2 in which at least one of the air moving means  
2 accomplishes a variable air speed.
- 1 4. The water generating device of claim 3 further including a controller means, responsive  
2 to the dew point sensor means, that controls the speed of at least one of the variable-speed air  
3 moving means in response to the ambient air dew point, to increase the overall device water  
4 generating efficiency, and operate the device over a wider range of ambient conditions.
- 1 5. The water generating device of claim 1 in which the passage means includes an air duct  
2 in which both the cold sink and heat sink are housed.
- 1 6. The water generating device of claim 5 further including a condensed water outlet in the  
2 air duct, to allow the condensed water to pass out of the duct.

- 1 7. The water generating device of claim 6 in which the air duct is arranged with a lowest  
2 area, and the condensed water outlet is in the bottom of the duct in its lowest area.
- 1 8. The water generating device of claim 6 further including an ultraviolet light proximate  
2 the outlet, to irradiate condensed water exiting the duct through the outlet, to sterilize the water.
- 1 9. The water generating device of claim 6 further including a water storage device for  
2 holding condensed water passed out of the duct through the outlet.
- 1 10. The water generating device of claim 3 further including a temperature sensor for  
2 determining the temperature of the cold sink.
- 1 11. The water generating device of claim 10 further including a controller means, responsive  
2 to both the temperature sensor and the dew point sensor means, that controls the speed of the  
3 variable-speed air moving means , to maintain the cold sink below the dew point of the ambient  
4 air.
- 1 12. A water generating device for efficiently extracting water from ambient air, comprising:  
2 a thermoelectric cooling device having a cold side and a hot side;  
3 a cold sink thermally coupled to the cold side of the cooling device, for cooling air that  
4 contacts the cold sink;  
5 a heat sink thermally coupled to the hot side of the cooling device, for removing heat  
6 from the cooling device;  
7 an air duct providing an air passage past the cold sink and directly to and past the heat  
8 sink;  
9 at least one variable-speed air moving device for directing a stream of ambient air  
10 through the air duct past the cold sink to cool the air below its dew point and condense water

11 from the air stream, and then past the heat sink, to remove additional heat from the cooling  
12 device to increase its efficiency;  
13 a dew point sensor for determining the dew point of the ambient air;  
14 a temperature sensor for determining the temperature of the cold sink; and  
15 a controller, responsive to both the dew point sensor and the temperature sensor, that  
16 controls the speed of at least one of the variable-speed air moving devices, to maintain the cold  
17 sink temperature below the ambient air dew point, to maintain efficient water production.

1 13. The water generating device of claim 1 further including an ultraviolet light proximate  
2 the cold sink.

1 14. The water generating device of claim 1 further including an ultraviolet light proximate  
2 the hot sink.

1 15. The water generating device of claim 1 enabled for continuous operation.

1 16. The water generating device of claim 2, further including means for periodically  
2 sampling the dew point of the ambient air.

1 17. The water generating device of claim 2 enabled for an efficiency mode of operation in  
2 which the device is operated only when the dew point is at least at a predetermined level.

1 18. The water generating device of claim 5 in which the air duct defines an ambient air  
2 entrance that communicates with the heat sink, and further comprising an air moving means in  
3 fluid communication with such entrance to allow additional ambient air to be moved across the  
4 heat sink, to enhance cooling of the heat sink.

1 19. The water generating device of claim 18 further including a heat sink temperature sensing  
2 means.

1 20. The water generating device of claim 19 further including controller means, responsive to  
2 the heat sink temperature sensing means, for controlling operation of the additional air moving  
3 device.

1 21. The water generating device of claim 1 further including means to heat stored water.

1 22. The water generating device of claim 1 further including means to cool stored water.

1 23. The water generating device of claim 1 further including means to change the  
2 temperature of water that has been extracted from ambient air using the device.

1 24. The water generating device of claim 1 further including solar power generating means  
2 operatively coupled to the water generating device for providing power to operate the water  
3 generating device.

1 25. The water generating device of claim 5 further including one or more air diverters located  
2 within the air duct to increase turbulence of air flow through the duct, for increasing the  
3 efficiency of the device.

1 26. The water generating device of claim 1 wherein at least one of the heat sink and the cold  
2 sink comprise corrugated fins.

1 27. The water generating device of claim 26 wherein the corrugations of the fins are parallel  
2 to the air flow through the passage means.

1 28. The water generating device of claim 26 wherein the corrugations of the fins are  
2 perpendicular to the air flow through the passage means.

1 29. A system for providing sterilized air to a storage container that stores water from a water  
2 generating device that extracts water from ambient air, comprising:

3 passage means for providing air flow into the storage container as water is withdrawn  
4 from the storage container; and

5            an ultraviolet light which bathes the passage means in ultraviolet light to sterilize the air  
6    as it enters the passage means.